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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]**

[0001]

[Field of the Invention] This invention relates to the gear-tooth brush in which a brush bundle carries out movable according to the brushing force.

[0002]

[Description of the Prior Art] Conventionally, what put slitting into the head section and gave the hinge effectiveness as a gear-tooth brush which gave the movability to the head section or a brush bundle (for example, Patent Publication Heisei No. 501221 [ five to ], the thing (for example, Patent Publication Heisei No. 502846 [ ten to ] which filled up the slitting section with elastic body resin, the thing (for example, JP,63-66928,U) which held the bottom section of a brush bundle with spring structure are known. Moreover, what held the bottom section of a brush bundle with the elastic body (for example, JP,63-93829,U, JP,1-81924,U) is known.

[0003]

[Problem(s) to be Solved by the Invention] However, what put slitting into said head section might be deeply cut during brushing, and the section might deform it plastically, and it had a possibility that the fit nature of the hair ends to a tooth flank might fall.

[0004] Moreover, in order that what filled up said slitting section with the elastic body might carry out movable [ of the slitting section ] (flexibility) to a boundary line per hair transplantation section, it moved to the part without the movable need, and had a possibility that the fit nature of the hair ends to a tooth flank might fall.

[0005] Moreover, the space for putting in a spring etc. was required for what held the bottom section of said brush bundle with spring structure between the tooth back of the head section, and the brush bundle maintenance side edge section, it is not sanitary, and it ate, \*\*\*\* etc. tended to enter and many water and things to which the operability within the oral cavity falls were further looked at [ the head section becomes thick on that structure, and ] by this space part.

[0006] moreover, as what held the bottom section of said brush bundle with the elastic body Although there are some (JP,1-81924,U) which formed the framework of the head section by rigid resin, formed the elastic base in the thing (JP,63-93829,U) it was made to make an elastic body hold in the framework which consists of this rigid resin, and the head section hair transplantation side, and transplanted hair in the brush bundle on this Since the framework of rigid resin is required, while in the case of the former the dimension from head \*\*\*\* to the brush bundle of a hair transplantation side becomes large too much and the operability within the oral cavity falls compared with the usual gear-tooth brush Since a motion of a brush bundle was not fully able to be taken, either, and the brush bundle was made movable only by telescopic motion of an elastic body base when it is the latter, it was difficult to realize a motion of an ideal brush bundle.

[0007] It was made under the above-mentioned situation, a brush bundle can move in all the directions of front and rear, right and left and the vertical direction free according to the brushing force, the brush point fits various irregularity in the oral cavity good, and this invention carries out the object of offering

the gear-tooth brush which can raise the brushing effectiveness which was excellent also to a part like the throat in the oral cavity.

[0008]

[Means for Solving the Problem] The principle structure of the gear-tooth brush of this invention is shown in drawing 1. The \*\* type amplification side elevation of one brush bundle part [ in / in (a) / the gear-tooth brush of this invention ], a cross-sectional view [ in / in (b) / the B-B line position in (a) ], and (c) are the cross-sectional views in the C-C line position in (a).

[0009] In order that the gear-tooth brush of this invention may attain said object, it holds the bottom section of the brush bundle 1 with the elastic body 2 for brush bundle maintenance, and combines this elastic body 2 for brush bundle maintenance with the hair transplantation side 4 of the head section 3 in cross-section location C-C with an area smaller than that cross-section maximum area location (maximum cross-section location of longitudinal direction [ of the brush bundle 2 ], and perpendicular direction) B-B.

[0010] In addition, cross-section area SC of the C-C line position which is said bond part Cross-section area SB in the B-B line position which is the cross-section maximum area location of the elastic body 2 for brush bundle maintenance It is desirable to consider as 3/4 or less area, and it considers as 2/3 or less area more preferably.

[0011] When it considers as such a configuration, it can move in all the directions of front and rear, right and left and the vertical direction free according to the force in which the elastic body 2 for brush bundle maintenance which held the brush bundle 1 in drawing 2 (a) and (b) as an arrow head and the chain line showed acts at the time of brushing. For this reason, the brush point can fit various irregularity in the oral cavity good, and can raise the brushing effectiveness which was excellent also to a part like the throat in the oral cavity.

[0012] Cross-section area SC of said bond part A motion of the brush bundle 1 is influenced. If the cross-section area SC is too large, the elastic body 2 for brush bundle maintenance cannot incline, a motion of the brush bundle 1 will serve as only telescopic motion of the vertical direction of the elastic body 2 for brush bundle maintenance, and the optimal motion will not be obtained. On the contrary, cross-section area SC When too small, a brush bundle moves by the force of acting at the time of brushing, too much, and there is a possibility that the brushing effectiveness may fall. Therefore, it is said cross-section maximum area SB, considering the construction material of the elastic body 2 for brush bundle maintenance. It is desirable to set up suitably within the limits of 3/4 or less according to the specification of a gear-tooth brush.

[0013] Moreover, it is desirable to set up suitably so that the size of said elastic body 2 for brush bundle maintenance, a configuration, and construction material may also have sufficient hair transplantation reinforcement (brush bundle drawing reinforcement) according to the specification of the brush bundle 1 held.

[0014] In addition, the elastic body as used in the field of this invention points out the elasticity resin in which rubber elasticity is shown in ordinary temperature, such as for example, thermoplastic-elastomer resin and silicone resin. When using thermoplastic elastomer, the thing of the olefin system which can make a resin degree of hardness into soft grade, or a styrene system is more desirable.

[0015] although there is especially no definition and it is suitably chosen according to extent of the resiliency to need about the softness of the elasticity resin used as an elastic body -- a test method JIS K6301 and test condition JISA the time of measuring -- 5-60 -- the thing of the hardness of 20-50 is preferably desirable. Moreover, the thing of different construction material and hardness may be intermingled in the one head section.

[0016] Moreover, the elastic body 2 for brush bundle maintenance may be constituted, when the whole of the whole does not need to consist of elasticity resin and it surrounds or covers a part of rigid resin with elasticity resin.

[0017] Association to the hair transplantation side 4 of the head section 3 of the elastic body 2 for brush bundle maintenance should just use welding and fitting. The cylindrical fitting object of the predetermined die length which made the head the splenium of a predetermined configuration is really

especially formed in the base of the elastic body for brush bundle maintenance. When this cylindrical fitting object is embedded in the hair transplantation side of the gear-tooth brush head section 3, or this cylindrical fitting object is penetrated and embedded to the tooth back of the head section and it is made to stop by the tooth-back side of the head section Bonding strength with the head section 3 can be increased without sacrificing the movability of the elastic body 2 for brush bundle maintenance, and it will become more desirable.

[0018] In order to fix the bottom section of the brush bundle 1 to the elastic body 2 for brush bundle maintenance, the approach of transplanting hair to the hair transplantation hole of an elastic body using a metal wire, the approach of fusing the edge of a brush bundle and welding to the hair transplantation hole of an elastic body, etc. are employable. Moreover, in case an elastic body is injection molded with metal mold, it is also possible to insert a brush bundle in metal mold and to really fabricate. Moreover, when transplanting hair using a metal wire, a hair transplantation chip is used and you may make it hold a hair transplantation chip with the elastic body 2 for brush bundle maintenance.

[0019] 1 or more than it is sufficient as the number of the brush bundles 1 held at one elastic body 2 for brush bundle maintenance, and what definition does not have in the cross-section configuration of the brush bundle 1, either, and was similar to typefaces of the alphabet, such as U typeface besides a round shape or a polygon (for example, C typeface) and V typeface, may be used.

[0020] The brush bundle 1 held at the elastic body 2 for brush bundle maintenance may be in the location of head section 3 throat, and can also choose the number suitably according to the specification of a gear-tooth brush.

[0021] There is especially no definition also in the embedding depth of the brush bundle 1 to the elastic body 2 for brush bundle maintenance, and the projection dimension of the brush bundle 1 from the elastic body 2 for brush bundle maintenance, and it can be suitably set to them. After the hair transplantation to the head section hair transplantation side of other brush bundles other than brush bundle 1 held at the elastic body 2 for brush bundle maintenance combines with a head section hair transplantation side the elastic body attaching part 2 which transplanted hair in the brush bundle, before [ the ] or any is sufficient as it.

[0022] Moreover, the sense of the brush bundle 1 held at the elastic body 2 for brush bundle maintenance may be parallel to the sense of other hair-bundles which are not held at the elastic body 2 for brush bundle maintenance, and there may be. [ no ]

[0023] Head section configurations known conventionally, such as the shape of a straight-way type, a bow configuration, and a refraction configuration, can be used for the configuration of the head section 3. Moreover, the various configurations where the configuration of the hair transplantation side 4 is also known conventionally are employable.

[0024] you may form at the embedding, simultaneously two or more point gates of an elastic body, such as elastomer resin embedded at a gear-tooth brush pedicel etc. for a skid, and when the elastic body 2 for brush bundle maintenance and the elastomer resin of a gear-tooth brush pedicel are the same construction material, it may be made to join together in the embedding field and slot of elastomer resin of a gear-tooth brush pedicel, and shaping of the elastic body 2 for brush bundle maintenance may be fabricated at once at the same gate.

[0025] As a raw material of the hard part of the gear-tooth brush handle containing the head section, although polypropylene, polyethylene, polyester, a polyamide, polymethylmethacrylate, cellulose propionate, ABS, etc. can be used, polypropylene sees [ synthetically ] in respect of physical properties, a price, etc. and is [ that what is necessary is just thermoplastics ] desirable. Moreover, it is also desirable to consider as the multi-color molding handle combined with these resin and thermoplastic elastomer.

[0026] About the hair end configuration at the head of the brush bundle 1, various hair end configurations, such as the crest end, the common end, the round end, and front section convex, are employable like the usual gear-tooth brush.

[0027] As construction material of the brush which constitutes the brush bundle 1, the polyamides (example: Nylon 612, Nylon 610, 12 nylon, etc.) and polyester (example: polybutylene terephthalate,

polyethylene terephthalate, etc.) which are usually used, polypropylene, etc. can be used. Of course, you may be the quality of composite which combined these.

[0028] Although the cross-section configuration of the brush also has a main round shape, it does not limit especially. For example, various cross-section configurations, such as a triangle cross section, a square cross section, and a hexagon cross section, are employable.

[0029] A brush size is good for 3-10 mils (0.076-0.254mm) and a desirable gear-tooth brush with common 5-8 mils (0.127-0.203mm).

[0030] Moreover, you may be the gestalt of the taper hair to which a path becomes thin gradually as it usually goes at the head of hair ends except for the hair-ends rounding-off section, even if it is the above-mentioned brush size near the brush bottom section, although it is a diameter of the same within one brush.

[0031] Moreover, the head configuration of the brush may have the shape of the shape of the shape of a spatula, and point thin broad, and a ball etc., and that from which the size of the brush differs may be intermingled in the hair transplantation section.

[0032]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. The gestalt of operation of the 1st of the gear-tooth brush applied to this invention at drawing 3 is shown. The gestalt of this 1st operation makes the head section 3 the shape of a straight-way type, and combines with two pieces or two trains the elastic body 2 for brush bundle maintenance which held the brush bundle 1 to the point of the hair transplantation side 4 of the head section 3 which becomes the shape of this straight-way type. In addition, the brush bundle shown with a sign 5 is a brush bundle which transplanted hair directly to the hair transplantation side 4 of the head section 3.

[0033] The gestalt of operation of the 2nd of the gear-tooth brush applied to this invention at drawing 4 is shown. Turn the gestalt of this 2nd operation up, it bends the part of 3, makes it incline about 1/the head side of the head section 3, and combines with two pieces or two trains the elastic body 2 for brush bundle maintenance which held the brush bundle 1 into this dip part.

[0034] The example of said 1st [ the ] and the joint approach to the hair transplantation side 4 of the head section 3 of the elastic body 2 for brush bundle maintenance in the gestalt of the 2nd operation is shown in drawing 5 and drawing 6 . Drawing 5 can adjust the bond strength of the elastic body 2 for brush bundle maintenance, and the movability by changing the embedding depth of the elastic body 2 for brush bundle maintenance with the hair transplantation side 4 of the head section 3 by welding is shown and it is shown in (a) and (b).

[0035] Drawing 6 is what shows the example at the time of combining the elastic body 2 for brush bundle maintenance with the hair transplantation side 4 of the head section 3 by fitting. Moreover, (a) and (b) Cylindrical fitting object 2a of the predetermined die length equipped with the splenium (for example, a spear form, a globular form) at the head is really formed in the base of the elastic body 2 for brush bundle maintenance. The example at the time of embedding this cylindrical fitting object 2a in the hair transplantation side 4 of the gear-tooth brush head section 3 and drawing 6 (c) Cylindrical fitting object 2a of the predetermined die length equipped with the splenium (for example, disk type) at the head is really formed in the base of the elastic body 2 for brush bundle maintenance. This cylindrical fitting object 2a is penetrated and embedded to the tooth back of the head section 3, and the example at the time of making it stop by the splenium by the tooth-back side of the head section 3 is shown, respectively. This drawing 6 (a) Bonding strength with the head section 3 can be increased without sacrificing the movability of the elastic attaching part 2, when the joint approach like - (c) is adopted.

[0036] The gestalt of operation of the 3rd of the gear-tooth brush applied to this invention at drawing 7 (a) and (b) is shown. The gestalt of this 3rd operation embeds one brush bundle 1 which consists of a big cross sectional area which tied up many brushes of a book into a knot in the top face of this ellipsoid while making an ellipsoid the configuration of the elastic body 2 for brush bundle maintenance.

[0037] The gestalt of operation of the 4th of the gear-tooth brush applied to this invention at drawing 8

is shown. The gestalt of this 4th operation embeds two brushes bundles 1 which consist of a small cross sectional area which tied up into a knot the brush of a small number of book in the top face of this ellipsoid while making an ellipsoid the configuration of the elastic body 2 for brush bundle maintenance.

[0038] Drawing 9 (a) Other examples of a configuration of the elastic body 2 for brush bundle maintenance are shown in - (g), and the example of the arrangement pattern to the head section hair transplantation side of the elastic body 2 for brush bundle maintenance is shown in drawing 10 (a) - (h), respectively. The elastic body 2 for brush bundle maintenance can take various configurations and arrangement patterns so that it may illustrate.

[0039] The example of the projection dimension of the brush bundle 1 and the die length of the elastic body 2 for brush bundle maintenance is shown in drawing 11. An example when an example when (a) makes the die length of the elastic body maintenance 2 and the projection dimension from the elastic body maintenance 2 of the brush bundle 1 almost the same, and (b) make the die length of the elastic body 2 for brush bundle maintenance longer than the projection dimension of the brush bundle 1, and (c) show the example at the time of making the projection dimension of the brush bundle 1 larger than the die length of the elastic body 2 for brush bundle maintenance, respectively. Thus, the projection dimension of the brush bundle 1 and the die length of the elastic body 2 for brush bundle maintenance can be freely set up according to the specification of a gear-tooth brush.

[0040]

[Effect of the Invention] As explained above, according to the gear-tooth brush, the bottom section of a brush bundle is held with the elastic body for brush bundle maintenance to this invention. Since this elastic body for brush bundle maintenance was combined with the hair transplantation side of the head section in the cross-section location where area is smaller than the cross-section maximum area location According to the brushing force, a brush bundle can move in all the directions of front and rear, right and left and the vertical direction free, the brush point can fit various irregularity in the oral cavity good, and the brushing effectiveness which was excellent also to a part like the throat in the oral cavity can be raised.

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[Translation done.]